Jackson, Edward

Relation of Ophthalmology to Prevention of Blindness.

and directed toward the equator of the eyeball in the lower temporal quadrant. The blade is at first held so as to make the skin incision parallel to the fibers of the orbicularis muscle. When the resistance of the sclera indicates that the eyeball has been reached the blade is turned into a meridional direction in relation to the globe. Care must be taken not to plunge the knife too deeply into the eye, for the blade is pointed farther forward than in the usual procedure and may easily injure the lens. After the sclera has been penetrated the blade is turned through an angle of ninety degrees so as to make a T-shaped or cruciform incision. After withdrawing the knife a collodion dressing can be applied to the skin. The eye requires no dressing.

The operation is easy to perform and may be repeated if necessary.

1212 Eutaw place.

RELATION OF OPHTHALMOLOGY TO PREVENTION OF BLINDNESS

EDWARD JACKSON, M.D., F.A.C.S.

DENVER

The influence of the effort to relieve and prevent blindness upon the development of ophthalmology is here traced. The causation of blindness through neglect of various eye lesions is pointed out. Address delivered before the joint meeting of the Chicago Ophthalmological Society and the Illinois Society for the Prevention of Blindness, October 14, 1927.

Human beings have understood the calamity of blindness. The Greeks did not agree where Homer was born, they did not agree whether he lived 800 or 1200 B.C., but they all agreed that he was the "blind poet of Greece". In Egypt, when the "Book of the Dead", the Ebers papyrus, was written, the part on the eye was by a specialist. He wrote the oldest account of ophthalmology that has yet come to our knowledge. About the same time, 3500 years or longer ago, the code of Hammurabi, unearthed at Nineveh, told of the penalty for causing blindness, or for blindness ensuing on treatment.

Tracing the history from the earliest time that we can recognize it up to the present day, blindness has fixed the attention of young people upon the function of the eye, the dangers to the eye, and the importance of means to guard against those dangers, to preserve the most important sense that human beings have. It is unnecessary to trace in detail what has been the development of ophthalmology. But, at many points, it has been clearly the reaction of human intelligence and human sympathy and desire to the calamity of blindness.

We have gone on from the early development and treatment of ophthalmias, from the treatment of cataract, attempted and done with more or less success in India probably for five thousand years, through the serious conditions that attracted the attention of the Greeks; and the whole history of ophthalmology brings us, again and again, in contact with the problem of blindness, or the problems that spring out of blindness, for there are many of them. Trachoma was evidently one of the most distinctly recognized diseases of ancient Egypt. We still have it in our catalogue of important causes for blindness.

The Greeks recognized strabismus, but it is notable that nothing was done for the treatment of strabismus until in the last century it was found that the squinting eye had poor sight, and that strabismus in many cases was responsible for the poor sight. Today the argument of the importance of saving the sight of the eye, making it as useful as possible, giving it the best chance for development, is the strongest argument that we have to urge for the operative treatment of strabismus.

Cataract and gutta serena, blindness where there was not a cataract, were known from ancient times. When modern ophthalmology had its birth seventy-five years ago in the use of the ophthalmoscope, one of its first important applications was for discrimina-

RETROCONJUNCTIVAL POSTERIOR SCLEROTOMY IN GLAUCOMA COMPLICATED BY CORNEAL OR CONJUNCTIVAL INFECTION

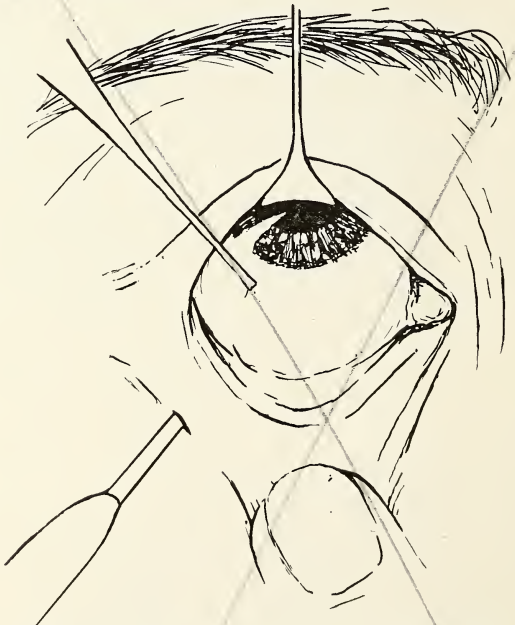
JONAS S. FRIEDENWALD, M.D.

BALTIMORE

Under general or local anesthesia, and after lifting the conjunctiva of the lower cul-de-sac out of the path of the incision, a cataract knife is introduced through the skin near the lower temporal angle of the orbit and directed toward the equator of the eyeball. The operation is particularly to be employed in the presence of conjunctival or corneal infection. From the department of ophthalmology Johns Hopkins Medical School. Read before the Section on Ophthalmology of the Baltimore Medical Society, October, 27, 1927.

The operation which is to be described requires scant argument to demonstrate its usefulness. Every ophthalmic surgeon is familiar with the tragic circumstances of cases of glaucoma with high tension, urgently in need of operation, in which on account of conjunctival or corneal infection the usual modes of operative interference are contraindicated. Medicinal measures are resorted to, often with little hope of their efficacy. If, in such cases, the intraocular tension could be reduced even temporarily, so as to give the physician time to combat the external infection, many an eye could be saved with useful vision. While the infection makes the usual operative approach impossible, the skin surface of the lids can be adequately sterilized and an incision made without entering the conjunctival sac, thus avoiding the danger of intraocular infection.

General or local anesthesia can be used. An eye speculum is not necessary.



Retroconjunctival posterior sclerotomy (Friedenwald).

The skin surface about the site of incision can be sterilized with tincture of iodine. While the assistant holds down the lower lid with his finger the operator grasps the conjunctiva near the lower temporal limbus with a fixation forceps. By taking a large bite of conjunctiva with the forceps the lower cul-de-sac is lifted up out of the path of the incision.

A cataract knife with a long blade is now introduced through the skin near the lower temporal angle of the orbit

tion between cataract and the diseases causing blindness that had been confused with it; particularly, as we know now, glaucoma, atrophy of the optic nerve, and lesions of the retina.

The end is not yet. We have seen the application of biomicroscopy. Most interest has been aroused in this new application of the microscope to the living eye, because of the light it seems likely to throw on pathological processes that still lead to blindness. Professor Koeppe's demonstrations called special attention to the nodules in the iris which, he taught, showed either syphilis, tuberculosis, or sympathetic ophthalmia. We do not all agree that this is the case; but the fact that these were given as an evidence of diseases that are marked by great danger of blindness surely added to the interest of his demonstration.

The time has come when the old order of attack in medicine is giving place to the new. The management of active and particularly of acute disease, the operations to remove disease, are giving way to the prevention of such conditions. As our vision extends farther, as we see farther ahead in the prognosis of any case of disease of the eye, it is perfectly natural that we should pay more and more attention to prevention. Blindness has made its impression on the general consciousness of civilized nations, arousing sympathy, awakening the desire to help, in all sorts of people and in all possible ways; and, responding to the same influence, the medical profession is working more and more for the prevention of blindness.

Ophthalmology is so closely intertwined with the history of our knowledge of blindness in the past that we should see, in this present stage, the outlook for the prevention of blindness. How wide the opportunity is can only be appreciated by reflecting on the problems that today are involved in such prevention.

In the program of this meeting we find, as a first item, bacterial invasion, a menace to the newborn. The bacteriology of ophthalmology is just opening up. Within a very few years we have seen a new light thrown upon it by the work of Lindner with regard to trachoma and other conjunctival infections.

Then comes the state's function in promoting prophylaxis in the eyes of the newborn. We heard yesterday an interesting account of the first assumption of that function, from Dr. Lucien Howe, one of the men who were active in bringing forward the prevention of ophthalmia neonatorum to a recognized place in law, and a recognized place in public health policy; this opening up in other directions the eyes of the seeing to the necessity for the prevention of blindness. Next we find syphilitic eye tragedies and their prevention by early treatment. Can any ophthalmologist read this program and not feel that everyone of these subjects implies great fields for advance and development in ophthalmology.

We have new light thrown on the development of the eye and all the relations of that development to sight by the talk given before the illuminating engineers yesterday afternoon, on "How we learn to see and how we learn some other things".

Then comes the intensity of light, and speed and vision study with reference to industrial situations. Then the "four mental factors" in seeing suggested to most ophthalmologists a new point of view.

This morning we dealt with the prevention of industrial eye injuries. That is as practical as any subject that can ever be brought to our attention; one we come in contact with in everyday practice.

This afternoon there was opened up a line of work for the prevention of blindness in which ophthalmology must lead, if advance is to be made. That is, the care of the eyes of school children, the detection of defects, the importance of giving the child, perhaps with minor defects, a fair chance to use his eyes and succeed, in this civilization which rests on vision. All that, if it is to be healthy development, must be guided by the knowledge of those who have studied ophthalmology, who are more interested in it than anything else, and who are ready to help the public in their efforts to prevent blindness.

The morning given over to "sight-saving classes" introduces a different aspect of protection of the eyes of the young, helping those who had not a fair start to overcome the handicaps that were laid upon them and to take their part in life. After a luncheon conference we come back to the old problem of Egypt, the trachoma problem, very much the same problem for us as it was in the days of 1500 B.C.

We have had a wonderful advance in the last fifty years with reference to the treatment of injuries, with reference to the understanding of the causes of inflammation following trauma, and the control of the results of such injuries. But, among those familiar with the ophthalmology of today, who does not feel that instead of having achieved the goal, we are just starting toward it; perhaps getting merely a glimpse of the pathway that leads in the right direction?

Our knowledge of infection, based on our knowledge of bacteria, and on the observance of symptoms by the most exact methods, is preparing us to treat injuries and the results of injuries better than they have been treated heretofore. You who are in ophthalmology know that blindness which comes from injuries depends half the time, at least, upon the sequels to the injury, upon the infections, and at every step the case presents the problems of therapeutics. Improvement of all ophthalmic therapeutics must go on if we are to do a proper share in the work of preventing blindness.

The prevention of blindness is not concerned much with those who have become blind; but an understanding of how others are to be protected from this calamity may be based on statistics of blindness as it now exists. At what time of life do people become blind? We can take figures from the statistics of the census of 1910 for the United States which were rather carefully worked up, although they may not be entirely reliable. The number of blind under one year of age is set at one-tenth of one percent of all the blind in the community; under five years of age at one percent of all the blind in the community. Three and nine-tenths percent of all the blind population have become blind by twenty years of age.

But remember that throughout life the number living at any particular age is growing less. The mass statistics with reference to blindness show that rather over one-half of the blind in a community are over sixty years of age.

Under one year of age there are thirty-two blind for each million of population; under five years of age, fifty-two per million. At twenty years of age the number has risen to 243, at forty years of age to 396, at sixty years of age to 1326, at eighty years of age to 4,589; and over eighty-five years it would be 25,748 out of one million who reached that age. The falling number of population and the rising percentage of blindness become very impressive when considered together.

The average age of the general population is set down at twenty-four years. The average age of the blind is 59.6 years. Sight is lost in the great mass of cases through attacks of disease, by transgression of the laws of health, throughout life. Blindness is the summing up of strain, injury and disease that have gone before, and when that fact is fully recognized by the ophthalmologist it must carry with it a sense of responsibility.

Interstitial keratitis, or the scars of phlyctenular keratitis, frequently, by the degenerating processes of nutrition in later life, become more and more obtrusive and serious. I have seen, where there was a clear history of phlyctenular keratitis in childhood, scars in the cornea that were scarcely noticeable up to sixty years of age but became very marked after that and could be as much a cause of senile blindness or impairment of vision as cataract is in the average case.

There are probably other lesions acquired early in life that pass through similar stages, and become of practical importance only many years after they occurred and often after they have been forgotten. Glaucoma is often inherited. Liability to cataract is inherited. The danger is a congenital characteristic of the particular individual, and yet these things only develop, we only become conscious of

them, in the later part of life. Optic atrophy may rest on a cause many years back; with no manifestation until the changes of age progressively slow down nutrition, lessen the power of repair, and produce complete blindness from atrophy of the optic nerve.

Up to 125 years ago, smallpox was one of the common causes of blindness throughout the civilized world. It is still a cause of perhaps eight to twelve percent of blindness in some countries that have pretty good statistics on the subject, but do not have enforced vaccination.

In the southern part of Colorado we have quite a large Mexican population; and from them, where vaccination is often omitted, we get today a certain number of cases of blindness from **smallpox.** One of the most striking cases that I have ever encountered was when I went on duty at the Denver General Hospital several years ago. An old woman was very anxious to see me, I was told. She had come in during the three months of my predecessor's service. In the three months that I was on duty I never went to the hospital that she was not anxious for me to see her and see if something could be done for her sight. She was seventy-five years old and had never been vaccinated. She had taken smallpox, both of her eyes had suppurated, and the sight was entirely lost.

That sort of case occurs so unusually now, that in order to get the full benefit of it and to do justice to the age in which we live, the example must be emphasized. Seventy-five years, when at any time immunity could have been had and the danger avoided, were passed without obtaining protection. How many other cases of blindness do we encounter in which likewise a very long period has passed, when careful study of the case would have shown dangers to be avoided, and in the end the omission of such study results in the blindness of old age.

A few years ago I had occasion to go over several hundred cases of **cataract** in their different early stages. Those had been under observation for several years. My conclusion from the history of those cases was that on the average it was about twenty years from the time that symptoms of cataract, limited opacities, are clearly detected in the eye up to the time of blindness from cataract.

There are constantly, perhaps, in every community, seventy-five percent of the people who are over seventy years of age that have had some start of cataract, and yet they need not, in the great mass of cases, ever come to the issue of an operation, or to blindness; because most of these cases depend on causes that can be detected and removed. One of these causes, a very common cause, is eye-strain. The lack of appreciation of the importance of **eye-strain** is responsible for a certain number of cataracts. I have frequently noticed people who came unusually late for glasses, perhaps fifty years or even older before they would wear glasses for near work, who had signs of cataract; and then, after the wearing of glasses and care of their eyes, the evidence of cataract never increased, or increased so slowly that the patients went on five, ten, or fifteen years after it was detected, and never were seriously inconvenienced by the change in their eyes.

I mention these things because in our daily practice we are coming in contact with very large numbers of people, who are possible subjects of future blindness. In fact, the mere theory of probabilities would show that a large number of them will become blind at some time, and they will become blind from accumulated damages to their eyes that might have been avoided, or the consequences largely escaped. Does not that place upon everyone who undertakes to advise with reference to the care of and treatment of the eyes an enormous responsibility for the future prevention of blindness?

This matter of eye-strain suggests one common following after false gods that we are guilty of in common with other branches of the medical profession, and that is the importance we attach to operations and their immediate visible results, as compared with, say, the importance of giving the patient the right glasses so as to avoid eye-strain.

A few years ago I saw a patient who had advancing cataract, but had been able to use his eyes and keep on with his business, by keeping his pupils somewhat dilated. Then he told me he was going to Europe and wanted to consult some famous ophthalmologist there. I gave him the name of one. I did not see him for a couple of years afterward. He went to one of the most famous operators in the world, and had the cataract removed. He did not entirely like the way he was treated there, so the next year he went to another very famous operator in Europe and had the other cataract removed. I saw him about a year and a half after he came back. He was dissatisfied.

The extractions had been done with iridectomy and capsulotomy, and the results were as beautiful as I ever saw. But his vision was only one-third, and he had had exceptionally good vision before he developed the cataracts, and he was not satisfied with the result. He had been given glasses only a few weeks after the operations. Probably they were given with the idea that they would be changed subsequently; but the glasses had given him only one-third vision. When he came back to me, his beautiful extractions, with the correction of his astigmatism, gave him 1.3 vision in each eye. That rise from 0.3 to 1.3 was just as valuable to him as to anybody.

A woman who had applied for a blind benefit in Colorado had been advised to have her cataracts removed. She went to one excellent ophthalmic surgeon and had one cataract removed. The eye became infected and was lost. Still the temporary improvement of vision induced her to go to another surgeon, also of large experience and skillful. He removed the other cataract, and this time the result was more fortunate, there was no serious infection. Both of these surgeons were ready to operate for cataract, for this patient who could pay nothing for it. But after the cataract had been removed, it was a somewhat difficult case to get the right glasses for, and the surgeon who had been so successful in the operation "could not do anything more for her sight". He felt it was not worth while to try to fit glasses. Therefore, she was sent out with vision of 1/10, enough to go about, with the glass that she had. The correction of her astigmatism gave her between 4/10 and 5/10 vision, enough to do ordinary reading. It raised her from the level of the practically blind to fairly good vision. Her gratitude for that improvement in vision was as great as for a good cataract operation.

We need to be turned away from the spectacular things in the practice of ophthalmology, to the watching of minute details; and, perhaps, to the watching of cases over long periods. The care of little things, properly attended to in the earlier years of life, will prevent life from ending in blindness. That is the important lesson that blindness has still to thrust upon us, to bring to our attention; to enforce our interest in it and so develop ophthalmology to a new efficiency that will really make blindness rare and rather a thing of historical interest.

There are other things that should be mentioned; such as **myopia** and **retinal detachment.** The cases of myopia that go from bad to worse are, in my experience, cases of neglected refraction. They may sometimes have gone so far at an early age that glasses alone would not be sufficient, but the myopia school, the school adapted to defective sight and to the eyes that cannot stand the general school strain, must assist them. Cataract and detachment of the retina, belonging to late myopia, are as preventable as any other form of blindness, or any other form of serious disease. But prevention depends on close watching and long care to avoid them.

Glaucoma. There are many varied elements in it, and glaucoma has a bad reputation. We have had a great deal of reason to feel hopeless about cases of glaucoma; and when they are recognized we are glad if they will go to somebody else. But there are cases which show that glaucoma can be permanently controlled and cured. I have in mind a patient who came with one eye blind from glaucoma, the other with attacks of acute glaucoma that had been going on for a considerable

time. The blind eye finally was operated on for hemorrhagic glaucoma. That patient had been going perhaps twenty years after the age of presbyopia and inadequate glasses, and yet trying to keep on using her eyes for sewing and reading. When the issue was forced, by this eye going blind in glaucoma, one of the things immediately done was to give her the right correction; and the removal of the constant strain permanently checked the glaucoma in the remaining eye. At first we used miotics, but after that we stopped them entirely, and the patient lived several years without any renewal of glaucomatous symptoms, and without any operation on the surviving eye.

In the problem of glaucoma there are many elements, some of the most important of which we do not yet understand. But the things that we have learned about prevention teach us to expect great gains in this particular disease. Other sources of glaucoma are untreated or poorly treated inflammations of the uveal tract. Every inflammation of the uveal tract raises the liability to blindness, whether it is from syphilis, from tuberculosis, or from focal infection of other kind. We are only just beginning to know the causes that lie back of such inflammations, and, in looking to them, to see our opportunity for prevention of the sequels.

A good many of the cases of damage to the eyes in early life are connected with the acute dangers of contagious diseases; measles, occasionally mumps, chickenpox, scarlet fever. Measles, scarlet feaver, and spinal meningitis have particularly bad reputations in that direction. This raises the importance of the proper treatment of those cases at the time they are acute; and the final result will depend on the wisdom and persistence of that treatment, by ophthalmologists and by general physicians.

Tumors, parasites, senile degenerations, tuberculosis are all things that run a course of years; and all likely to end in blindness. The early recognition, the early diagnosis, the willingness to take the responsibility of foresight, and apply effective measures now rather than wait, would often prevent blindness. That is the direction for the future development of ophthalmology—that, and conscientious thoroughness in what we undertake to do, and the willingness to follow up and learn from ultimate results the new lessons that they can teach.

217 Imperial building.

SIGHT-SAVING CLASS WORK FROM THE STANDPOINT OF THE OPHTHALMOLOGIST

E. V. L. Brown, M.D.

CHICAGO

Certain medical considerations in connection with sight saving classes are dealt with, namely, th degree of vision or lack of it which should allocate the pupil to a sight saving class, what ocular dis turbances other than those of binocular central vision should determine such allocation, and whether child with a remediable eye defect should be excluded from the class if the parent refuses remedia treatment. The causes of defective vision in Chicago sight saving class pupils are tabulated. Rea before the annual conference of the National Committee for the Prevention of Blindness, held i cooperation with the Illinois Society for the Prevention of Blindness, at Chicago, October 13 to 15 1927.

There are no new principles involved in sight-saving class work; only an ingenious combination of well known medical, social, and educational procedures molded into a practical and happy educational device.

The outstanding medical feature is that eyes which cannot read ordinary school book type can read type enlarged so that letters such as T L O are about 3/16 of an inch in size. Regular text books are printed in this enlarged type, the same books as used by pupils who have normal sight.

The outstanding social principle involved is that physically handicapped children should not be needlessly segregrated from others of their age and social group. The blind pupil must of necessity, unfortunately, remain segregated from other pupils throughout his day's school work, but the sight-saving class pupil merely needs the enlarged type, more light, more room, and more of the teacher, than the ordinary pupil. This is secured largely by north light, movable desks, and the assignment of only twelve or fifteen pupils to the room teacher, instead of from thirty to fifty. Pupils of all ages, six to seventeen, then study and prepare their lessons from the enlarged type, maps, charts, and so on, under the guidance of the teacher in this room, but go to rooms all over the building for recitation with the pupils who have normal vision. Teachers require certain special training for this work, and for a number of years the National Committee for the Prevention of Blindness and other agencies have sponsored courses of training of this nature, so that a goodly proportion of the sight-saving teachers have been specially trained. All considered, there does not seem to have been much greater diffi culty in fitting this special work int the general educational system of thi country and of England, where th classes are known as myope classes than has been the case with classes fo the undernourished, crippled, tuber culous, mentally deficient, blind, o deaf children, all of which thrive. A with them, space, apparatus, an teachers cost the public more. Bu classes for the blind cost much mor and for the considerable number o children who cannot see well enough t read ordinary print there is no othe alternative except the school for th blind with its unfortunate but ap parently unavoidable social and educa tional shortcomings.

Medical Considerations

Sight-saving class work was intro duced into Chicago in 1919 by th Illinois Society for the Prevention o Blindness, and my experience with it a an ophthalmologist began at that time The first question was, and I thin still is, What degree of vision or lac of it should allocate the pupil to sight-saving class? Standards were no then well established, and in conferen with Dr. Wm. H. Wilder, Professor Ophthalmology, Rush Medical Colleg a corrected vision of 20/60 to 20/ was adopted as the dividing line b tween regular school work and sigh saving class assignment; and, althou each case must be and has been d cided on its merits, this standard h

* Through the far-sightedness and who hearted cooperation of Mr. John B. Curtis a Frank G. Brunner, of the Chicago public schoo the Board of Education has generously provid the many special teachers, the rooms, and t equipment needed for this work as rapidly as grew, from 1919 on.